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THE DISTRIBUTION OF THE WESTERN BUDWORM, *CHORISTONEURA OCCIDENTALIS* FREEMAN (LEPIDOPTERA: TORTRICIDAE), IN WYOMING[1]

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Abstract.—*Choristoneura occidentalis* Freeman distribution in Wyoming, based largely on ultraviolet light trap data, is presented. Additionally, larval and pupal collections were made on the major host, Douglas fir, *Pseudotsuga menziesii* (Mirb.) Franco var. *glauca* (Beissn.) Franco.

Choristoneura occidentalis Freeman is a widely distributed western polychromatic species, difficult to distinguish other than by genital dissection. Until 1967, *C. occidentalis* was considered to be a western form of the spruce budworm, *Choristoneura fumiferana* (Clemens) (Freeman, 1967). Consequently, it is surprising that, although the species is recorded from southern British Columbia to northern New Mexico, no published records exist for Wyoming (Freeman, 1967; Stehr, 1967; Powell, 1980). The purpose of this paper is to fill in this distribution gap. Additionally, by establishing a long series in the University of Wyoming insect collection, taxonomists will have access to material should the necessity arise for the naming of additional species based on subsequent physiological and genetic studies.

Like the spruce budworm, *C. occidentalis* exhibits periodic population explosions, which are detrimental to both lumber and recreation industries. Unpublished records for Wyoming suggest that these outbreaks are infrequent, although once initiated they may be widespread and extend over several years. McKnight (1967) mentions an outbreak that terminated in 1936 in Cody Canyon, Shoshone National Forest, Park County. Other population explosions occurred in the Front Range forests of Colorado in 1958 and 1959. These outbreaks were widespread in susceptible stands in Colorado and had extended into northcentral Wyoming in the Big Horn and Shoshone National Forests by 1962 (McKnight, 1967). The Missoula Forest Insect Laboratory reported an infestation in Yellowstone National Park in 1952 which, when discovered, extended over 2000 acres. By 1956, the infestation had spread to 142,500 acres of Douglas fir (Johnson, 1957).

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Methods

During the summer of 1980, an extensive survey was made of shelterbelts and forested areas throughout Wyoming for the purpose of determining the distribution of Tortricinae. Adult collections were made primarily with an ultraviolet light trap. Larval and pupal collections were also made to augment the light trap data.

Results

In Wyoming, *Choristoneura occidentalis* collections were associated with four species of conifers: 1) Douglas fir—*Pseudotsuga menziesii* (Mirb.) Franco var. *glauca* (Beissn.) Franco, 2) Limber pine—*Pinus flexilis* James, 3) Lodgepole pine—*Pinus contorta* Dougl., and 4) Englemann spruce—*Picea englemannii* Parry, all of which are hosts listed by Stehr (1967). Based on light trap data, *C. occidentalis* was most abundant in 1980 in a Douglas fir—Limber pine forest in Sinks Canyon, 19.4 km (12.1 mi) SW of Lander, Fremont Co., on July 23, 1980.

As noted by Stehr (1967), the major host of *C. occidentalis* is Douglas fir. We found larvae and pupae associated with new cones of Douglas fir at Pine Creek Ski Area, 7.4 mi NE of Cokeville, Lincoln Co., on July 17, 1980. Last instar larvae were found in burrows at the base of the cones which they apparently used as shelters when not feeding on the needles. Pupae were found just above the base of the cones in needles tied together with silken shelters spun by the last instar larvae. Pupae were collected and reared, with adults emerging between July 19 and August 1.

Though uncommon, *C. occidentalis* has been collected from shelterbelts (3 in Platte County and 2 in Laramie County) on five different dates from June 30 to July 14. Shelterbelts, common throughout Wyoming, often contain at least one row of conifers and might be expected to act as reservoirs of *C. occidentalis*. However, the known hosts are not used in Wyoming shelterbelts. Two possibilities exist to explain the presence of this moth in shelterbelts: 1) unknown host, or 2) aerial dispersal.

An unknown host seems improbable because only one to three specimens were collected from each shelterbelt. Conversely, in localities in which the known hosts are present, 10 to several hundred adults were collected.

Aerial dispersal by summer thunderstorms or prevailing winds seems a more likely possibility. Morris (1963) recognizes two forms of long range dispersal of *C. fumiferana* in New Brunswick: 1) convectional transport and 2) turbulent transport. Convectional transport is the movement of segments of a population from one area to another by prefrontal or air mass storm cells. Turbulent wind transport causes the gradual and continual downwind spreading of populations by surface winds. Both dispersal forms could transport *C. occidentalis* to shelterbelts in eastern Wyoming. In all cases Douglas fir occurs within 16 to 72 km of these sites and is the probable source of shelterbelt specimens. The Laramie Range, with elevations of 2438 to 2743 m, borders the western edges of Platte and Laramie Counties. Severe thunderstorms, which move in an easterly direction, can build up over the range and possibly pick up portions of *C. occidentalis* populations and redeposit them in shelterbelts. Prevailing winds in summer also move from west to east and moths in normal flight above the tree canopy could be transported several kilometers (Morris, 1963).

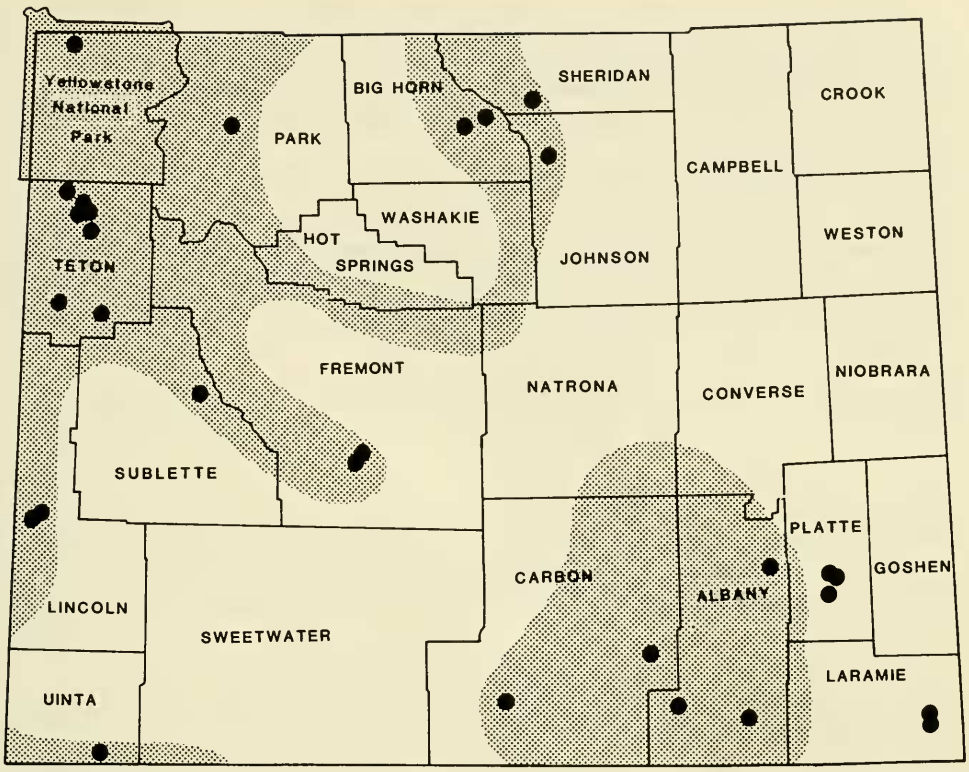

Fig. 1. Distribution of *Choristoneura occidentalis* Freeman (closed circles) and that of its major host, Douglas fir, *Pseudotsuga menziesii* (Mirb.) Franco var. *glauca* (Beissn.) Franco (shaded areas), in Wyoming.

Choristoneura occidentalis has a seasonal range from June 30 to August 18 in Wyoming. The accompanying map (Fig. 1) illustrates the currently known Wyoming distribution of this species.

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